

## CLAIMS

1 1. A magnetic head including a write head, comprising:  
2 a first (P1) magnetic pole;  
3 a second (P2) magnetic pole;  
4 a write gap layer being disposed between said P1 magnetic pole and said P2 magnetic  
5 pole;  
6 at least one of said P1 magnetic pole and said P2 magnetic pole being composed  
7 of a NiFe ion composition, and wherein the ratio of Ni to Fe is graduated throughout portions of  
8 either of said P1 magnetic pole and said P2 magnetic pole.

1 2. A magnetic head as described in claim 1 wherein said P1 magnetic pole is formed with a  
2 first portion wherein the relative concentration of Ni and Fe is approximately constant and a  
3 second portion wherein the relative concentration of Ni and Fe ions is graduated.

1 3. A magnetic head as described in claim 2 wherein said second portion of said P1 magnetic  
2 pole is disposed proximate said write gap layer.

1 4. A magnetic head as described in claim 3 wherein the Fe concentration in said second  
2 portion varies from approximately 20 wt.% to approximately 60 wt.%.

1 5. A magnetic head as described in claim 4 wherein a portion of said second portion having  
2 an Fe concentration of approximately 60 wt.% is disposed proximate said write gap layer.

1 6. A magnetic head as described in claim 1 wherein said P2 magnetic pole is formed with a  
2 first portion wherein the relative concentration of Ni and Fe is graduated, and a second portion  
3 wherein the relative concentration of Ni and Fe is approximately constant.

1 7. A magnetic head as described in claim 6 wherein said first portion of said P2 magnetic  
2 pole is disposed proximate said write gap layer.

1 8. A magnetic head as described in claim 7 wherein the Fe concentration in said first portion  
2 varies from approximately 60 wt.% to approximately 20 wt.%.

1 9. A magnetic head as described in claim 8 wherein a portion of said first portion having  
2 said approximately 60 wt.% Fe concentration is disposed proximate said write gap layer.

1 10. A magnetic head including a write head, comprising:  
2 a first (P1) magnetic pole being composed of a NiFe composition, wherein the ratio of Ni  
3 to Fe is graduated throughout portions of said P1 magnetic pole;  
4 a second (P2) magnetic pole being composed of a NiFe composition, and wherein the  
5 ratio of Ni to Fe is graduated throughout portions of said P2 magnetic pole;  
6 a write gap layer being disposed between said P1 magnetic pole and said P2 magnetic  
7 pole.

1 11. A magnetic head as described in claim 10 wherein said portion of said P1 pole having  
2 said graduated composition is disposed proximate said write gap layer, and said portion of said  
3 P2 magnetic pole having said graduated composition is disposed proximate said write gap layer.

1 12. A magnetic head as described in claim 11, wherein the Fe concentration within said  
2 portion of said P1 magnetic pole having said graduated composition varies from approximately  
3 20 wt.% to approximately 60 wt.%, and wherein the Fe concentration of said P1 magnetic pole  
4 proximate said write gap layer is approximately 60% wt.%; and wherein the Fe concentration  
5 within said portion of said P2 magnetic pole having said graduated composition varies from  
6 approximately 60 wt.% to approximately 20 wt.%; and wherein the Fe concentration of said P2  
7 magnetic pole proximate said write gap layer is approximately 60 wt.%.

1 13. A hard disk drive including a magnetic head that includes a write head, comprising:  
2 a first (P1) magnetic pole being composed of a NiFe composition, wherein the ratio of Ni  
3 to Fe is graduated throughout portions of said P1 magnetic pole;  
4 a second (P2) magnetic pole being composed of a NiFe composition, and wherein the  
5 ratio of Ni to Fe is graduated throughout portions of said P2 magnetic pole;  
6 a write gap layer being disposed between said P1 magnetic pole and said P2 magnetic  
7 pole.

1 14. A hard disk drive as described in claim 13 wherein said portion of said P1 pole having  
2 said graduated composition is disposed proximate said write gap layer, and said portion of said  
3 P2 magnetic pole having said graduated composition is disposed proximate said write gap layer.

1 15. A hard disk drive as described in claim 14, wherein the Fe concentration within said  
2 portion of said P1 magnetic pole having said graduated composition varies from approximately  
3 20 wt.% to approximately 60 wt.%, and wherein the Fe concentration of said P1 magnetic pole  
4 proximate said write gap layer is approximately 60 wt.%; and wherein the Fe concentration  
5 within said portion of said P2 magnetic pole having said graduated composition varies from  
6 approximately 60 wt.% to approximately 20 wt.%; and wherein the Fe concentration of said P2  
7 magnetic pole proximate said write gap layer is approximately 60 wt.%.

1 16. A method for fabricating a write head portion of a magnetic head, comprising the steps  
2 of:

3 fabricating a P1 magnetic pole by electroplating NiFe material, wherein the duty cycle of  
4 an electroplating current is varied during the electroplating process to form a P1 magnetic pole  
5 having a graduated NiFe composition;

6 fabricating a write gap layer upon said P1 magnetic pole;

7 fabricating a P2 magnetic pole upon said write gap layer by electroplating NiFe material,  
8 and wherein the duty cycle of the electroplating current that is utilized in said electroplating  
9 process is varied to form a P2 magnetic pole having a graduated NiFe concentration.

1 17. A method for fabricating a magnetic pole as described in claim 16 wherein said duty  
2 cycle of said electroplating current of said P1 magnetic pole is greatest proximate said write gap  
3 layer, and said duty cycle of said electroplating current of said P2 magnetic pole is greatest  
4 proximate said write gap layer.

1 18. A method for fabricating a magnetic head as described in claim 17 wherein the current  
2 density of said electroplating current is from  $4 \text{ mA/cm}^2$  to  $16 \text{ mA/cm}^2$  for both said P1 magnetic  
3 pole and said P2 magnetic pole.

1 19. A method for fabricating a magnetic head as described in claim 18 wherein an  
2 electroplating bath for fabricating said P1 pole and said P2 pole has Ni and Fe concentration  
3 ranges of from 5:1 Ni:Fe to 20:1 Ni:Fe.

What we claim is: